

THAT WHICH IS CLAIMED:

1. An apparatus for adhering a plurality of wood pieces into a continuous wood panel from which can be cut a plurality of individual wood panels, said apparatus defining a machine direction and comprising:
  - 5 an infeed station configured to receive the wood pieces such that the wood pieces are oriented in a cross-machine direction;
  - an adhesive application station including at least one adhesive applicator configured to apply adhesive to a side of each wood piece; and
  - a singulation station positioned in proximity to the infeed station and
- 10 including an engagement mechanism configured to engage only one of the wood pieces oriented in the cross-machine direction at the infeed station and further configured to present the wood piece to the adhesive application station for applying adhesive to the wood piece so that the side of the wood piece to which the adhesive is applied can be adhered to an adjoining wood piece and thereby form at least part of
- 15 the continuous wood panel.

  

2. An apparatus of Claim 1, wherein the engagement mechanism comprises a gripper assembly that includes at least one gripper having a plurality of fingers configured to open and close about one of the wood pieces.

  

- 20 3. An apparatus of Claim 2, wherein the gripper assembly includes a shaft and the gripper is attached to the shaft, the shaft being rotatable between a first position, wherein the gripper is positioned to grip one of the wood pieces from the infeed station, and a second position, wherein the gripper is positioned to present the wood piece to the adhesive application station for adhesive application.

  

- 25 4. An apparatus of Claim 3, wherein the shaft is further rotatable to a third position, wherein the gripper is positioned to release the wood piece into a crowding station while maintaining orientation of the wood piece in the cross-machine direction.

5. An apparatus of Claim 4, wherein the gripper assembly includes four grippers positioned circumferentially about the shaft.

6. An apparatus of Claim 5, wherein the four grippers are 5 circumferentially spaced 90° apart, so that any three of the four grippers can be simultaneously, rotatably positioned at the first, second and third positions, respectively, by the shaft.

7. An apparatus of Claim 1, wherein the engagement mechanism 10 comprises a gripper assembly that includes a plurality of gripper sets and a rotatable shaft, wherein each gripper set includes four grippers arranged circumferentially at 90° intervals around the rotatable shaft and wherein the gripper sets are spaced along a length of the rotatable shaft.

15 8. An apparatus of Claim 1, wherein the adhesive application station further includes a gantry beam extending in the cross-machine direction above the singulation station, and the adhesive applicator is mounted on the beam for powered sliding movement in the cross-machine direction along a longitudinal edge of the one of the wood pieces presented by the singulation station for adhesive application.

20 9. An apparatus of Claim 8, wherein the adhesive applicator is further mounted for powered vertical movement toward and away from the longitudinal edge of the one of the wood pieces presented by the singulation station for adhesive application.

25 10. An apparatus of Claim 9, wherein the adhesive applicator is an adhesive extruder.

30 11. An apparatus of Claim 1, further comprising a crowding station positioned downstream from the adhesive application station, the crowding station including an upstream crowding device and a downstream crowding device, the crowding devices configured to move together so as to compress a batch of the wood pieces therebetween.

12. An apparatus of Claim 11, wherein the crowding station further comprises a conveying surface that includes an array of parallel slats oriented in the machine direction and defining an array of parallel openings therebetween, and

5 wherein the upstream crowding device includes a plurality of pusher fingers at spaced intervals corresponding to the array of openings and configured to interdigitate the pusher fingers into the array of openings so as to push the batch in the downstream direction, and wherein the downstream crowding device includes a plurality of restraining fingers corresponding to the array of openings and configured to

10 interdigitate into the array of openings so as to restrain the batch from movement in the downstream direction.

13. An apparatus of Claim 12, wherein the upstream crowding device further includes a beam, wherein the pusher fingers are mounted on the beam and the

15 beam is rotatable to interdigitate the pusher fingers into the array of openings.

14. An apparatus of Claim 11, further comprising a press station having an upper platen and a clamping device, wherein the upper platen is positioned to be downwardly moveable onto the batch of wood pieces, and wherein the clamping

20 device is configured to clampingly engage edges of the batch of wood pieces.

15. An apparatus of Claim 14, wherein the clamping device includes a plurality of offset clamping bars each having a portion extending below a lower surface of the upper platen and having attached thereto a respective one of a plurality

25 of clamping blocks, said clamping blocks being movable in a downstream direction by actuation of the clamping bars so as to clampingly engage the upstream edge of the batch of wood pieces.

16. An apparatus of Claim 15, wherein the clamping device further

30 includes a plurality of hydraulic cylinders positioned above the lower surface of the upper platen, the hydraulic cylinders connected to respective ones of the clamping bars and operative to actuate the clamping bars.

17. An apparatus of Claim 16, wherein the clamping station further includes a radio frequency curing device for curing the adhesive.

18. An apparatus of Claim 17, further comprising a cutting station 5 positioned downstream of the press station for cutting the continuous wood panel into individual panels.

19. A rotary transfer mechanism for transferring individual wood pieces from an infeed station to a crowding station, and for presenting the individual wood 10 pieces to an adhesive application station to form a panel, the rotary transfer mechanism comprising:

a rotatable shaft;  
a drive mechanism operably connected to the rotatable shaft; and  
a gripper assembly including a shaft and at least one gripper attached 15 to the shaft, the shaft being rotatable between a first position, wherein the gripper is positioned to grip one of the wood pieces from the infeed station, and a second position, wherein the gripper is positioned to present the wood piece to the adhesive application station for adhesive application.

20. A rotary transfer mechanism of Claim 19, wherein the gripper includes 20 a plurality of fingers configured to open and close about the wood piece.

21. A rotary transfer mechanism of Claim 19, wherein the shaft is further rotatable to a third position, and wherein the gripper is positioned to release the wood 25 piece to the crowding station while maintaining orientation of the wood piece in the cross-machine direction.

22. A rotary transfer mechanism of Claim 21 wherein the gripper assembly includes four grippers positioned circumferentially about the shaft.

30 23. A rotary transfer mechanism of Claim 22, wherein the four grippers are circumferentially spaced 90° apart, so that any three of the four grippers can be

simultaneously, rotatably positioned at the first, second and third positions, respectively, by the shaft.

24. A press apparatus for pressing a batch of wood pieces fed from a 5 crowding station and having upstream and downstream edges, the press apparatus comprising:

an upper platen positioned to be downwardly moveable onto the batch of wood pieces; and

10 a clamping device including a plurality of offset clamping bars each having a portion extending below a lower surface of the upper platen and having attached thereto a respective one of a plurality of clamping blocks, said clamping blocks movable in a downstream direction by actuation of the clamping bars so as to clampingly engage the upstream edge of the batch of wood pieces while the upper platen presses the batch of wood pieces against the lower platen.

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25. A press apparatus of Claim 24, wherein the clamping device further includes a plurality of hydraulic cylinders positioned above the lower surface of the upper platen, the hydraulic cylinders connected to respective ones of the clamping bars and operative to actuate the clamping bars.

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26. A press apparatus of Claim 25, wherein the clamping station further includes a radio frequency curing device for curing the adhesive.

27. A method of adhering wood pieces into a continuous panel from which can be cut a plurality of individual wood panels, said method comprising:

orienting the wood pieces in a cross-machine direction at an infeed station;

engaging only one of the wood pieces oriented in the cross-machine direction at the infeed station;

presenting the wood piece to an adhesive application station;

applying adhesive to a side of the wood piece using an adhesive applicator; and

releasing the one of the wood pieces into a crowding station while maintaining orientation of the one of the wood pieces in the cross-machine direction so that the side of the wood piece to which the adhesive is applied can be adhered to an adjoining wood piece and thereby form at least part of the continuous wood panel.

28. A method of Claim 27, wherein said engaging step comprises gripping the wood piece using a first gripper of a gripper assembly, and further comprising gripping a second one of the wood pieces oriented in the cross-machine direction using a second gripper of the gripper assembly while presenting the first one of the wood pieces to the adhesive application station.

29. A method of Claim 28, further comprising releasing a third one of the wood pieces oriented in the cross-machine direction into the crowding station by opening a third gripper of the gripper assembly while presenting the first one of the wood pieces and gripping the second one of the wood pieces.

30. A method of Claim 27, wherein the presenting of the wood piece comprises rotating the wood piece into a position subjacent the adhesive applicator.

31. A method of Claim 30, wherein the releasing of the wood piece comprises rotating the wood piece to a position on the crowding station.

32. A method of Claim 27, further comprising crowding the wood pieces into a batch at the crowding station.

33. A method of Claim 32, further comprising pressing the batch of the wood pieces at a press station by supporting the batch and lowering an upper platen onto the batch, and by extending a clamping device through a lower surface of the upper platen and onto an upstream edge of the batch so as to compress the batch in a downstream direction.

34. A method of Claim 33, wherein extending a clamping device through the lower surface includes extending a plurality of clamping blocks through the lower

surface and onto the upstream edge of the batch by actuating a plurality of clamping bars each ending in one of the plurality of clamping blocks.

35. A method of Claim 34, further comprising curing the adhesive of the clamped batch of wood pieces by radio frequency.